Here are some things to keep in mind before we start our discussion of:

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Dopamine and Addiction

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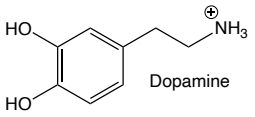

1) Dopamine neurons respond to rewards such as food with reflexive, linked, **bursts of discharges**.

   - Dopamine neurons also come to respond with bursts of discharges to stimuli that immediately precede and reliably predict the reward.
   - Bursts of discharges (also called phasic firing) of dopamine-containing neurons are necessary to establish long-term memories associating predictive stimuli with rewards.

2) Actual dopamine neuron activity is very complicated as there can be shifts in so-called tonic activity (the overall baseline of activity) as well as phasic activity, that is the bursts of discharges associated specifically with an event.

3) Within the striatum, close to half of the output neurons express only D1-type receptors, and the other half express only D2-type receptors.

   - D1 receptors have low or loose binding to dopamine and are thus infrequently occupied by dopamine molecules.
     - Current thinking is that D1 receptors activate when high dopamine is released due to a **reward** being received and repeated activation leads to **learning how to anticipate and seek the reward**.
   - D2 receptors have high or tight binding to dopamine and are usually occupied by dopamine molecules.
     - Current thinking is that D2 receptors activate to stop a behavior associated with a **punishment** and repeated activation of D2 receptors leads to **learning how to avoid that punishment**.
     - **LOSS of D2 receptors therefore leads to risk-taking and an ignoring of negative consequences.**
   - Schizophrenia is a disabling psychiatric disorder with many positive, negative and cognitive symptoms that can be attributable to an imbalance between dopaminergic pathways that signal D2 and D1 receptors.

4) Addiction is commonly identified with habitual nonmedical self- administration of drugs. It was usually defined by characteristics of intoxication or by characteristics of withdrawal symptoms.

   - Addiction is caused by molecules that act to release dopamine.
   - ***Unusually high levels of dopamine caused by drugs of addiction activate D1 receptors and decrease the number of D2 receptors on neurons***
     - ***Both of these effects are amplified with increased or longer use.***